

Sodium Metaborate 8 Mol

$\text{NaBO}_2 \cdot 4\text{H}_2\text{O}$ [or $\text{Na}_2\text{B}_2\text{O}_4 \cdot 8\text{H}_2\text{O}$]

Sodium Metaborate Tetrahydrate

Technical Grade: Granular

CAS Number 10555-76-7

Sodium metaborate 8 mol, an alkaline salt with excellent buffering properties, consists of white crystalline granules. The high solubility of sodium metaborate 8 mol can provide a much higher concentration of borate ions in solution than Neobor[®] borax 5 mol or borax at the same temperature.

Applications and benefits

Photochemicals

Sodium metaborate 8 mol is used as a component of photographic developers and replenishers. Its principal function as a buffering agent is to control the pH within close limits. This is essential both in fine grain black-and-white developers and in ensuring the correct color balance in color developers.

Adhesives

The specific effect of sodium metaborate 8 mol in the preparation of starch and dextrin adhesives is due to the high degree of alkalinity and the crosslinking reaction of borate anions with polyhydroxy groups. The interchain linkage produces an adhesive with increased viscosity, quicker tack and better fluidity properties. These qualities are essential for use in corrugated boxes, paper bags, laminated paper boards, carton/case sealing, gummed tape, and tube winding.

Textile processing

Textiles such as cotton are bleached with hydrogen peroxide solutions which can be stabilized by sodium metaborate. In addition, sodium metaborate neutralizes the acidic oxidation products formed during bleaching. Textile sizing can be controlled by incorporation of the adhesive material within the thread and by binding all the fibers together to increase the tensile strength of the thread. Sodium metaborate is added to the starch adhesives to accomplish these functions.

Detergents and cleaners

Sodium metaborate 8 mol is used in hard surface cleaners to remove oil, grease, rust, scale and other particulates from metal or glass surfaces. The cleaning action is enhanced by the alkaline conditions imparted by sodium metaborate. Sodium metaborate can also be incorporated in liquid laundry detergents for pH control, enzyme stabilization, and its builder properties.

Corrosion inhibition

Sodium metaborate 8 mol is incorporated in many proprietary water treatment chemicals requiring pH control and corrosion inhibition. They are used for protecting central heating systems and cooling towers against corrosion.

Chemical and physical properties

Theoretical composition

Boric oxide, B ₂ O ₃	25.25%
Sodium oxide, Na ₂ O	22.48%
Water of crystallization, H ₂ O	43.70%
Anhydrous equivalent, NaBO ₂	47.73%

Stability

Sodium metaborate 8 mol is stable at ordinary temperatures. If exposed to the atmosphere for extended periods, it will pick up carbon dioxide from the air and form sodium carbonate and borax. Sodium metaborate 8 mol shows little tendency to cake except after prolonged storage or if it becomes severely wetted by rain or substantial water penetration. When stored under normal conditions of temperature and humidity, sodium metaborate 8 mol is unlikely to cake or change chemically.

Melting point

The crystalline salt begins to melt in its own water at about 53.5°C (128°F). The anhydrous salt fuses to a clear glass at 966°C (1770°F). Some vaporization occurs above 1230°C (2246°F).

Hydrogen ion concentration

Aqueous solutions of sodium metaborate 8 mol show a moderate increase in pH with increasing concentration:

Sod. met. 8 mol (wt.)	pH @ 20°C (68°F)
0.1%	10.5
0.5%	10.8
1.0%	11.0
2.0%	11.2
4.0%	11.4
6.0%	11.5
8.0%	11.6
10.0%	11.8
15.0%	11.9
18.0%	12.0

Characteristics

Molecular weight NaBO ₂ ·4H ₂ O	137.88
Specific gravity	1.74

Solubility in water, as NaBO₂·4H₂O [or Na₂B₂O₄·8H₂O]

Temp °C (°F)	% by weight
0 (32)	30.4
5 (41)	32.9
10 (50)	35.6
15 (59)	38.8
20 (68)	41.9
25 (77)	45.3
30 (86)	49.5
35 (95)	53.6
40 (104)	58.5
45 (113)	64.5
50 (122)	71.5
53.6* (128.6)	77.3
55 (131)	77.9
60 (140)	80.3
65 (149)	82.8
70 (158)	85.7
75 (167)	88.4
80 (176)	91.6
85 (185)	95.1
90 (194)	99.3
95 (203)	103.9
100 (212)	109.8

*Transition to sodium metaborate 4 mol, which is stable from 53.6°C to 105°C.

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